and from there westward to the easternmost archipelagos of Japan.

TABLE 1.—*Averages, departures, and extremes of atmospheric pressure at sea level, North Pacific Ocean, April 1940, at selected stations*

Stations	Average pressure	Departure from normal	Highest	Date	Lowest	Date
	Millibars	*Millibars*	*Millibars*		*Millibars*	
Point Barrow [1]						
Dutch Harbor	995.0	−13.5	1,023	29	983	24
St. Paul	996.8	−12.0	1,018	29	992	1
Kodiak	1,010.7	+3.2	1,019	14	989	10
Juneau	1,014.2	−0.4	1,031	21	990	16
Tatoosh Island	1,017.6	+1.7	1,028	20	1,004	7
San Francisco	1,016.9	−0.7	1,023	29	1,006	1
Mazatlan	1,011.8	−0.4	1,015	21	1,006	18
Honolulu	1,016.6	−1.4	1,021	17	1,010	10
Midway Island	1,019.7	−0.3	1,031	16	1,008	29
Guam	1,013.0	+0.8	1,016	16, 19, 28	1,006	17, 18
Manila	1,011.2	+1.4	1,014	7	1,006	27
Hong Kong	1,013.5	+1.6	1,019	14	1,010	25
Naha	1,015.4	+2.2	1,021	9, 14	1,006	2
Titijima	1,016.1	+1.2	1,023	11	1,003	4
Petropavlovsk	1,010.8	+1.7	1,024	22, 24	988	15

[1] Data incomplete.

NOTE.—Data based on 1 daily observation only, except those for Juneau, Tatoosh Island, San Francisco, and Honolulu, which are based on 2 observations. Departures are computed from best available normals related to time of observation.

Extratropical cyclones and gales.—A greater than usual amount of cyclonic activity for April occurred over northern waters of the ocean. The result, in addition to the great deepening of the Aleutian LOW, was considerable storminess which affected the northern and middle steamer routes, particularly to the westward of the 160th meridian of west longitude. To the eastward of the meridian, ships reported few gales, and those mostly of force 8 only. Among these was a fresh gale on the 26th off the California coast, and another off the northwest coast of Washington on the 30th.

The principal stormy period of the month was that of the 1st to 8th, with three distinct cyclones involved. The earliest appeared east of the Kuril Islands on the 1st, then advanced into the Aleutian region where it remained for several days with slow rate of movement, centered to the southward of the islands. In this storm, vessels reported gales of force 8–9 within the region 30°–36° N., 160°–165° E., on the 1st, and of force 8–10 over more widely scattered localities to northward and eastward on the 2d. During the 3d to 6th gales were scattered through the cyclone area, with the most important, an east-southeasterly wind of force 10, lowest barometer 979.3 millibars (28.92 inches), encountered by the American steamer *Washington* near 49° N., 165° W. The strongest local wind reported in the cyclone occurred on the 7th near 38° N., 166° W., where the Norwegian motorship *Corneville* ran into a westerly gale of force 11, lowest barometer 986.3 millibars (29.13 inches).

The second cyclone of the period lay east of central Japan on April 3 and 4, causing stormy weather on both days, with a maximum wind force of 11 on the early morning of the 4th near 36° N., 143° E., barometer 986.8 millibars (29.14 inches), reported by the American steamer *City of Alma*. The cyclone moved eastward and by the 5th was causing locally heavy weather near 39° N., 165° E., where the American steamer *West Cusseta* encountered a westerly gale of force 10.

The third cyclone of the period entered northwestern waters on the 6th, and by the 7th showed considerable intensity over the waters midway between Japan and the western Aleutians. Pressures below 982 millibars (29 inches) were observed over a considerable area, with north to northwest gales of force 10–12 occurring near the 40th parallel between approximate longitudes 153° and 162° E. The one gale of the month to attain hurricane intensity was encountered by the *West Cusseta* near 40° N., 161° E., on the 7th. The vessel, steaming westward, had passed through the storm of the 5th, only to enter the succeeding storm two days later. Thereafter storm energy abated generally, and by the 8th and 9th only a few scattered gales of force 8, occurring along the central-latitude steamer routes in midocean, were reported.

The next locally stormy weather occurred on the 13th. The east-bound American steamer *Delarof*, at 3 a. m. of that date reported a west-northwest gale of force 11, with lowest barometer depressed only to 1,002.7 millibars (29.61 inches), near 31° N., 163° E. This is the only gale of record in connection with the cyclone, which was then central northwest of Midway Island.

The period May 20–24 was moderately stormy on northern waters, to the westward of longitude 160° W., with a cyclone strongly developed to the immediate southward of the Aleutian Islands. On the 20th a further cyclone, central well east of the Kuril Islands, was moving rapidly toward midocean. In this storm gales of force 9 and 10 occurred between the Kurils and longitude 170° E., north of the 40th parallel. The strongest gale, of force 10, from the southwest, was reported by the U. S. A. T. *Meigs*, in 44°12′ N., 166°30′ E., with the lowest barometer reading of the month, 963.1 millibars (28.44 inches). On the 21st this storm joined with the Aleutian cyclone. From the 22d to 24th scattered gales occurred between about latitude 37° N., and the Aleutians, longitudes 175° E., and 170° W., of which the most intense, of force 10 from the southwest, was experienced by the transport *Meigs* on the 24th, near 47° N., 169° W.

Tehuantepecers.—Northerly gales of force 8 occurred in the Gulf of Tehuantepec on the 13th and 14th.

Typhoons.—A report on a depression and a typhoon in the Far East, prepared by the Rev. Bernard F. Doucette, Weather Bureau, Manila, P. I., appears below.

Fog.—In east longitudes only 4 days were noted by ships as having fog. Along the northern routes in west longitudes 11 days had fog, but they were scattered over a wide strip of ocean, between the 5th and 23d, with no more than 3 foggy days in any one 5° square. Some 10° to 15° west of the California coast there was fog on the 9th and 10th. From Queen Charlotte Island northwestward and across the Gulf of Alaska fog was reported on 4 days. In coastal waters fog was noted on 1 day off Washington; on 8 days off California; and on 6 days off Lower California.

TYPHOONS AND DEPRESSIONS OVER THE FAR EAST, APRIL 1940

BERNARD F. DOUCETTE, S. J.

[Weather Bureau, Manila, P. I.]

Depression, April 10–14, 1940.—A depression, apparently of minor importance, formed over the ocean regions near the western Caroline Islands. It moved westerly, passing close to and south of Yap, and disappeared over the ocean about 250 miles west-northwest of Palau.

Typhoon, April 25–May 1, 1940.—A typhoon, violent over a small area, appeared close to and east of central Mindanao during the early morning hours of April 26. It moved rapidly in a northwesterly direction across northeastern Mindanao to the Mindanao Sea where it inclined to the west. During the evening hours of the same day it passed between Negros Island and the northern coast of Mindanao, apparently weakening. It

crossed the Sulu Sea, April 27, and passed about 30 miles south of Puerto Princesa between midnight and dawn, April 28. It moved west or west-northwest across the China Sea to the regions east of southern Indochina and filled up gradually south of the Paracel Islands and Reefs, apparently of minor intensity during these days.

From the observations received from Yap, there is no indication that this storm formed near that locality, or that it formed east or southeast of, and then moved past, the station. It may have formed over the regions adjacent to the Palau group of islands, but observations from Palau are not available for clearing up this point. The 6 a. m. observations from eastern Mindanao stations (not all were received on time) showed a fall of pressure which indicated that a depression might be forming east of Mindanao, and a warning, with this information, was sent to southern Philippine Island stations. Late in the forenoon of April 26, a message from the captain of the S. S. *Tjileboet* was received at the observatory, and is given herewith:

"4 a. m. Manila time, April 26, approximate position 8°30′ N., 127°00′ E. Narrow but violent typhoon passing south of us, lowest barometer reading 738.8 mm., wind northeast, 10, to south-southeast, 12; heavy swell, moderate sea. Have been under influence from midnight till 7 a. m." (738.8 mm.=985.0 mb.) Then observations from Port Lamon arrived, the data showing that the typhoon center had passed close to and south of the station. A value of 735.23 mm. (980.2 mb.), gravity correction applied, with northwest winds, force 11, was the minimum pressure, recorded at 6 a. m. No reports of pressure below 750.0 mm. (999.9 mb.) were received from any weather-bureau station while the typhoon moved toward the China Sea. The following observation from the S. S. *Don Isidro* was received at the observatory, April 27: "3 a. m. April 27, lat. 8°53′ N., long. 122°11′ E., bar. 747.5 mm.; temperature 82°; wind northeast by north, force 5; squally weather; rough sea; poor visibility." (747.5 mm.=996.6 mb.) The M. S. *Aloha*, at 6 a. m. April 28, experienced west winds, force 9, with a minimum pressure of 746.7 mm. (995.7 mb.) when anchored at latitude 9°00′ N., longitude 117°30′ E. This observation was not received at the observatory until the ship reached Manila.

Three lives were lost when the motorboat *Fookien* sank near Jonteza, Lianga (approximately latitude 8°38′ N., longitude 126°05′ E.). Towns along the coast of eastern and northern Mindanao suffered from strong winds, of short duration fortunately, and heavy rains.

After April 22, at Guam, the upper winds gave no indication of any disturbance forming over or near those regions, the winds varying from northeast to southeast and never reaching velocities of 50 k. p. h. Observations from Menado and Makassar, Celebes Island, stations of the Netherland East Indies network, were not received. Over the Philippines, it was impossible to obtain any upper air wind data over Cebu, April 26, because of rain. Before the typhoon appeared, winds from the north, northeast, and east directions were reported, under 50 k. p. h.; but strong southeast quadrant winds, as high as 70 k. p. h., occurred over Cebu April 27, decreasing quickly to values below 40 k. p. h. on April 28 and 29. At Zamboanga, the predominating directions were east and southeast until the afternoon of April 25, when north-northeast, north, and north-northwest winds, with velocities under 40 k. p. h. were reported. These directions continued on April 26, and the change to the west quadrant took place on the morning of April 27, when the typhoon center was in the Sulu Sea. The velocities, as reported, were 45 k. p. h. or less during these days. The change to the east and southeast quadrant directions came during the afternoon hours of April 28 and the morning of the 29th, when the disturbance was in the China Sea. No reports from Tarakan, Borneo, were received. When the typhoon was moving across the China Sea, there was very little evidence of a southwesterly current moving toward the center. The pilots from Medan, Sumatra, and Bandon, Thailand, seem to indicate, by the shift of the wind directions to the southwest quadrant, that the air was drawn toward the center of the disturbance rather than being forced toward the center. The velocities reported were not strong, only a very few groups of the pilots code showing values as high as 40 k. p. h. The few ships' observations from the southern part of the China Sea did not show the presence of a southwesterly current of any strength, a very good indication that the storm was weakening and filling up.